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SUBJECT: ARMENIA'S "LEAST COST" ENERGY FUTURE INCLUDES
NUCLEAR POWER

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Summary

1. (SBU) At a June 30 conference to plot out how Armenia's energy generation capability needs to change to match its projected demand, GOAM energy policy leaders and top USAID consultants presented persuasive arguments that Armenia must replace its aging nuclear power plant by 2015 with a new nuclear plant. Armenia's existing plant must continue to operate until replaced, the GOAM argued, but they set a hard date of 2015 for decommissioning and laid out costs for safety upgrades needed to keep the plant going until then. The Ambassador pushed hard for a concrete decommissioning plan and called for the GOAM to begin a fund to pay for the extensive associated costs. He also called on the GOAM to consider how to develop Armenia's energy policy in the context of a regional electrical system, a point that Energy Minister Movsisyan echoed in his own remarks. An October IAEA conference in Yerevan will focus on prioritizing and finding funding for safety upgrades for the existing nuclear plant. End Summary.

Least Cost Generation Plan Conference

2. (U) The Armenian Ministry of Energy held a conference in Yerevan to present their newly prepared Least Cost Generation Plan (LCGP) on June 30, 2006. The purpose of the LCGP report is to assist the Government of Armenia (GOAM) and international and donor organizations in determining solutions for a sustainable and economically viable program for securing a long-term electric power supply for Armenian consumers. The Minister of Energy led the conference, though all technical presentations were made by consultants from PA Energy, a USAID contractor which assisted the Ministry in preparing the LCG Plan. Key issues discussed regarding the existing nuclear power plant at Metsamor included safety upgrades, the timing of decommissioning, alternative replacements and rate impacts, nuclear plant decommissioning methodologies, the collection of funds for decommissioning, and the creation and management of a decommissioning fund.

3. (U) Energy Minister Armen Movsisyan opened the conference and emphasized that it was essential for Armenia to plan for the future and to develop replacement capacity for its aging power plant. He also mentioned that Armenia sought a role

within the regional energy market. The Ambassador's remarks (ref) emphasized that the U.S. recognized Armenia's goal to improve its energy security, but that donors would not consider involvement in new projects until the GOAM had a solid plan for decommissioning the existing nuclear plant, including financing for such a project. He welcomed the Minister's readiness to think more broadly and consider Armenia in a regional context. He challenged all conference participants to consider the implications for Armenia's energy security of a resolution to the conflict over Nagorno-Karabakh.

¶4. (U) The LCGP process applied scenario analysis to develop recommendations based on expected future demands, fuel cost, operating, capital costs, and maintenance expenditures. The best alternatives were tested against different potential economic and market conditions (such as demand, fuel price, and capital cost forecasts) and potential timing for retirement of Armenia's Nuclear Power Plant (ANPP) to determine validity of the long-term recommendations under differing conditions. Key conclusions were:

- that there is no financially or economically justified alternative to operation of the existing ANPP through 2015;
- that in order to continue service until 2015, the ANPP must undergo appropriate safety upgrade measures;
- the ANPP's generating capacity could be replaced with new thermal generation capacity, but this approach would result in higher overall costs and vulnerability to higher fuel prices, given trends in fossil fuel prices facing Armenia; and
- that the least-cost option is to provide new base-load generating capacity with a new nuclear power plant.

Electric Power Demand Forecast

¶5. (U) Discussing predicted growth in demand for electricity in Armenia, Deputy Energy Minister Areg Galstyan explained that the increase in demand had not tracked with Armenia's economic growth. With the closure of inefficient Soviet-era enterprises and - most importantly - improvements in efficiency which eliminated power loss and theft, electric power demand in Armenia has been relatively stable, but this has begun to change. The LCGP predicted demand would increase at an annual rate of between 1.9 and 3.4 percent, depending on economic growth scenarios.

Strategy to Broaden Base Load Generating Capability

¶6. (U) Armenia seeks to move forward with its plans to improve the efficiency of its thermal power generating units. Part of the agreement of sale to Russia's Gazprom of the fifth unit of Armenia's Hrazdan Thermal Power Station was a commitment for Gazprom to install an efficient combined-cycle gas turbine generator. A concessionary loan from the Japan Bank for International Cooperation is being used to install a combined-cycle turbine at the Yerevan power station. Armenia's existing hydro power units remain steady performers, but will require significant investment to remain on line. New hydro units are planned, but their reliable, year-round input to the grid would not make a significant contribution to the base load.

Armenia Seeks to Become Regional Power Center

¶7. (U) Currently, the Armenian power sector has about 100 percent excess generation capacity. However, much of this aging capacity will have to be taken out of service around 2016, at the same time that a new nuclear unit is brought into operation. While the LCGP justifies a large new nuclear plant (around 1000MW) based solely on domestic demand, a

large nuclear unit would also enable Armenia to export electricity regionally. Statements made by the Ministry of Energy clearly demonstrate that Armenia would like to become a regional generator and exporter of base load capacity.

Funding of ANPP Safety Upgrades and Decommissioning Costs

¶18. (U) In order to continue to operate the existing nuclear plant safely until 2015, Armenia must invest between USD 33 and 61 million in essential upgrades. Safety upgrade projects are urgently needed to ensure the safety of the ANPP plant as it continues to operate. Currently, the ANPP wholesale tariff includes an allowance of about USD 1.8 million per year for safety improvement costs. This is insufficient to cover planned safety upgrades, and full funding of USD 40 million in safety upgrade projects over the next four years would require approximately a 24 percent increase in the wholesale ANPP electric tariff.

¶19. (U) The LCGP also forecasted the expected cost, schedule and funding requirements for decommissioning ANPP. The 2016 present value for decommissioning and spent nuclear fuel (SNF) disposal for the shutdown of ANPP in 2016 is estimated at USD 176-241 million, depending on the disposal scenario. Decommissioning funds are typically accumulated from a surcharge on electric energy sales. While current decommissioning allowances in the ANPP wholesale tariff is about USD 4 million per year, these funds are not actually set aside and approximately USD 23 million per year needs to be collected over the next 20 years to cover the expected costs. Thus, the Armenian retail electric tariff needs to increase about USD 0.03/kWh to cover decommissioning costs. The GOAM expressed hope that international donors will cover the significant gap between the funds ANPP is collecting and the target amount.

¶10. (U) The cost of final disposal of SNF, while not usually included in decommissioning costs, represents a substantial future cost for ANPP that is currently unfunded. SNF has been accumulating at the plant since it was restarted in ¶1995. Returning the SNF to Russia for reprocessing would be the only technically and economically feasible disposal

option. However, this option is not currently available; PA Energy experts told us that the SNF processing plants in Russia are not accepting deliveries from abroad and that restrictions on the use of rail lines through Abkhazia currently prevent transport. It will not be possible to accurately estimate the costs of SNF disposal until the disposal plan is fully defined.

ANPP Replacement Options

¶11. (U) The LCGP considered several scenarios, including a "no nuclear" option. The production cost to implement the no-nuclear scenario was roughly equal to nuclear power, but nearly 70 percent of this production cost would be fuel, making this option extremely vulnerable to variations in gas price. The production cost for a nuclear power plant would be far more sensitive to the cost of capital than to construction or operating cost. Estimates for production cost ranged from as little as USD 0.25/KWh to USD 0.106/KWh depending on interest rates. PA Energy said that the most likely scenario would cost about USD 0.035/KWh. In order to implement the least cost resource strategy, Armenia will have to invest USD 2.8 billion over the next ten years. The estimated cost of a new nuclear plant constitutes about USD 2.2 billion of that total.

¶12. (U) PA Energy presented a Gantt chart which laid out a sobering timeline for Armenia to replace ANPP in time for decommissioning in 2015. The number of highly complicated tasks, many of which must be performed sequentially, requires a ten-year timeline to bring a new nuclear plant on line. PA Energy warned that the time line they presented was already compressed, and that the global boom in nuclear plant

construction and the consequent strain on producer capacity could be yet another limiting factor for Armenia's plan.

Two Year Action Plan

¶13. (U) The LCGP lays out a two-year action plan detailing the decisions that the GOAM needs to make. The following are the most crucial items of interest to the USG:

- ANPP's decommissioning date has to be formally set by passing a law through parliament and then communicated to the Armenian public and to international organizations;
- Comprehensive safety and environmental assessments of the existing ANPP site must be performed to determine the feasibility of the site for various decommissioning options and for a potential new nuclear unit;
- A decommissioning study must be completed, decommissioning and waste disposal plans and standards should be developed, a decommissioning fund created, and decommissioning costs must be collected from consumers through retail rates;
- The costs related to safety improvements should be collected through retail rates and or provided through grants by international organizations to ensure the continued safe operation of the ANPP;
- All capital improvements needed for safety improvements of ANPP as well as those required to continue operational through 2015 need to be fully funded;
- There is a need for a detailed technical and economic analysis and explore financing approach and options for constructing new generation capacity prior to 2016;
- The GOAM must address issues which would enable private sector financing of a new nuclear plant and select a waste disposal option.

Conclusions and Recommendations

¶14. (SBU) We welcomed the sober and thorough research and presentation and the serious way the GOAM presented this data. We anticipate that the GOAM will seek international assistance to pay for safety upgrades to ANPP, for decommissioning of the ANPP site, and for spent nuclear fuel disposal. It will also begin seeking financing for a new nuclear power plant. The GOAM has a very small window to

complete a new nuclear power plant by 2016, when it will have to come on line to replace the existing Metsamor facility.

¶15. (SBU) The USG's precondition to engaging in serious discussions about options to replace the power generated by ANPP -- delivered by Assistance Coordinator Tom Adams during the May 2006 U.S.-Armenia Task Force and reiterated at this conference by the Ambassador -- has been that Armenia must develop a decommissioning plan and launch a decommissioning fund. While the GOAM is collecting funds to finance partially safety upgrades to the existing plant, it has not yet initiated a decommissioning fund. Until it begins accumulating funds for at least part of this cost, we find it difficult to take seriously Armenia's commitment to close ANPP by 2015.

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